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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,306	11/20/2003	Hiroshi Higashitani	MAT-8489US	9776
23122	7590	04/21/2006	EXAMINER	
RATNERPRESTIA P O BOX 980 VALLEY FORGE, PA 19482-0980			RILEY, SHAWN	
			ART UNIT	PAPER NUMBER
			2838	
DATE MAILED: 04/21/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/718,306	Applicant(s) HIGASHITANI ET AL.	
	Examiner Shawn Riley	Art Unit 2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 10, 11, 14-16 and 22-24 is/are rejected.
- 7) ☒ Claim(s) 5-9, 12, 13, 17-21 and 25-29 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>nov03</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

1. Applicant(s) is(are) reminded of the proper content of an abstract of the disclosure. The abstract should not refer to purported merits (**decreasing power loss**) or speculative applications (**extend time of handy phone**) of the invention and should not compare the invention with the prior art. Correction is required.
2. Applicant(s) is(are) reminded of the proper language and format for an abstract of the disclosure. The form and legal phraseology often used in patent claims, such as "**comprises**", "means", and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. Correction is required. See MPEP § 608.01(b).
3. The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "**presented herein**" "The disclosure describes," "What is disclosed", "The invention relates to", "Methods and apparatus are provided", "The present invention provides", "According to the invention", "The objective of the invention", or like phrases, etc. Correction is required. See MPEP § 608.01(b).
4. The title of the invention is not descriptive. A new title is required that is clearly

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indicative of the invention to which the claims are directed. "Boost, Buck or Buck-Boost regulator" Correction is required.

Claim Rejections - 35 U.S.C. § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4 and 10-11, 14-16, and 22-24 are rejected under 35 U.S.C. §102(b) as being fully anticipated by Dwelley et al. (U.S. Patent 6,166,527). Dwelley et al. shows,¹ (in, e.g., the(ir) figures and corresponding disclosure)

As to claim 1;

¹ Note claims will be addressed individually and the material in parentheses are the examiner's annotated comments. Further unless needed for clarity reasons, recited limitation(s), will be annotated only upon their first occurrence. Annotated claims begin with the phrase "As to claim". Claims that are not annotated are seen as having already had the invention(s) addressed previously in an annotated claim and may be repeated for convenience of the applicant/examiner. Bolded words/phrases indicate rejected material based 112 paragraph rejections. Underlined words/phrases indicate objected to material. For method claims, note that under MPEP 2112.02, the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986). Therefore the previous rejections based on the apparatus will not be repeated.

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A DC/DC converter (see, e.g., figures 2A and 2B) comprising: a voltage converting circuit connected between an input terminal (V_{IN}) and an output terminal (V_{OUT}) for outputting an output voltage and a switch current detection signal (output at 21A); a fast transient response circuit (see, e.g., column 13 lines 40-42 wherein the circuit is the control for the circuitry) for receiving the output voltage (at, e.g., 21A), control voltage (V_{REF}), and switch current detection voltage (based on current through inductance, see, e.g., table at column 5 lines 56-63, wherein the switch current detection voltage is determined by one of the switch states as shown by the corresponding inductor voltage), and outputting a second control operation determination signal (output of 24); a step-up and step-down operation determining circuit (inside of 24) for receiving the output voltage, the control voltage, and input voltage, and outputting a first control operation determination signal; a voltage comparator (27) for receiving the output voltage, the control voltage, and the second control operation determination signal, and outputting a switch condition signal; and a switch control circuit (29) for receiving the switch condition signal, the first control operation determination signal, and the second control operation determination signal, and outputting a switch control signal, wherein the switch control signal is fed into the voltage converting circuit, and a feedback circuit is composed.

As to claim 2;

The DC/DC converter of claim 1, wherein the voltage converting circuit is composed of series connection of: a first switch circuit (A); an inductor (17); a second switch circuit

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(D); and a smoothing capacitor (16/18).

As to claim 3;

The DC/DC converter of claim 2, wherein the first switch circuit operates to connect the input terminal and inductor all the time when the voltage converting circuit is in step-up operation (by definition).

As to claim 4;

The DC/DC converter of claim 2, wherein the second switch circuit operates to connect the inductor and the smoothing capacitor all the time when the voltage converting circuit is in step-down operation (by definition).

As to claim 10;

The DC/DC converter of any one of claim 1, wherein the operation functions by selecting either one of two operation modes defined by the value of the threshold current of the whole load region set by the load current value and the output voltage value (system monitors threshold values of current to set operation).

As to claim 11;

The DC/DC converter of any one of claims 1, wherein the operation functions by selecting either one of two operation modes defined by the value of one or two or more

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threshold currents of the whole load region set by the load current value and the output voltage value system monitors threshold values of current to set operation).

14. (New) The DC/DC converter of claim 2, wherein the operation functions by selecting either one of two operation modes defined by the value of the threshold current of the whole load region set by the load current value and the output voltage value.

15. (New) The DC/DC converter of claim 3, wherein the operation functions by selecting either one of two operation modes defined by the value of the threshold current of the whole load region set by the Load current value and the output voltage value.

16. (New) The DC/DC converter of claim 4, wherein the operation functions by selecting either one of two operation modes defined by the value of the threshold current of the whole Load region set by the Load current value and the output voltage value.

22. (New) The DC/DC converter of claim 2, wherein the operation functions by selecting either one of two operation modes defined by the value of one or two or more threshold currents of the whole Load region set by the Load current value and the output voltage value.

23. (New) The DC/DC converter of claim 3, wherein the operation functions by selecting either one of two operation modes defined by the value of one or two or more threshold currents of the whole Load region set by the Load current value and the output voltage value,

24. (New) The DC/DC converter of claim 4, wherein the operation functions by selecting either one of two operation modes defined by the value of one or two or more threshold currents of the whole Load region set by the Load current value and the output voltage value.

Allowable Subject Matter

3. Claims 5-9, 12-13, 17-21 and 25-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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4. As allowable subject matter has been indicated, applicant's response must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 C.F.R. § 1.111(b) and section 707.07(a) of the M.P.E.P.

5. The following is an examiner's statement of reasons for allowance: As to claim 5, no prior art uncovered anticipates or renders obvious applicant(s) claimed DC/DC converter including outputting a load region detection signal; an output voltage change detecting circuit for comparing the control voltage and the output voltage, detecting the change of the output voltage, and outputting an output voltage change detection signal; and a control operation determining circuit for outputting the second control operation determination signal for determining a control mode of the switch control circuit by the load region detection signal and the output voltage change signal to the switch control circuit and the voltage comparator.

Further, as to claim 6, no prior art uncovered anticipates or renders obvious applicant(s) claimed DC/DC converter including comparing, and outputting an error voltage; an oscillating circuit for outputting a reference triangular wave signal based on the second control operation determination signal; and a switching condition determining circuit for comparing the error voltage and the reference triangular wave signal, and outputting the switch condition signal.

Further, as to claim 7, no prior art uncovered anticipates or renders obvious applicant(s) claimed DC/DC converter including the second control operation determining signal is a signal for determining the operation mode of either PWM or PFM.

Further, as to claim 8, no prior art uncovered anticipates or renders obvious applicant(s) claimed DC/DC converter including the oscillating circuit changes an oscillation frequency depending on the second control operation determination signal, and also executes to operate to change the switch frequency or time ratio of the switching condition determining circuit.

Further, as to claim 9, no prior art uncovered anticipates or renders obvious applicant(s) claimed DC/DC converter including a second cascade connection circuit composed of second switch circuit and second inductor; and a smoothing capacitor, wherein the first cascade connection circuit and the second cascade connection circuit are connected in parallel, and wherein the output of the first cascade connection circuit and output of the second cascade


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connection circuit are put into the smoothing capacitor.

Conclusion

Any inquiry from other than the applicant/attorney of record concerning this communication or earlier communications from the Examiner should be directed to the Patent Electronic Business Center (EBC) at 1.866.217.9197. Any inquiry from a member of the press concerning this communication or earlier communications from the Examiner or the application should be directed to the Office of Public Affairs at 703.305.8341. Any inquiry from the applicant or an attorney of record concerning this communication or earlier communications from the Examiner should be directed to Examiner Riley whose telephone number is 571.272.2083. The Examiner can normally be reached Monday through Thursday from 7:30-6:00 p.m. Eastern Standard Time. The Examiner's Supervisor is Karl Easthom who can be reached at 571.272.1989. Any inquiry about a case's location, retrieval of a case, or receipt of an amendment into a case or information regarding sent correspondence to a case **should be directed to 2800's Customer Service Center** at 571.272.2815. Any papers to be sent by fax MUST BE sent to fax number **571-273-8300**. Any inquiry of a general nature of this application should be **directed to the Group receptionist** whose telephone number is 571.272.2800. Status information of cases may be found at <http://pair-direct.uspto.gov> wherein unpublished application information is found through private PAIR and published application information is found through public PAIR. Further help on using the PAIR system is available at 1.866.217.9197 (Electronic Business Center).

April 06



Shawn Riley
Primary Examiner